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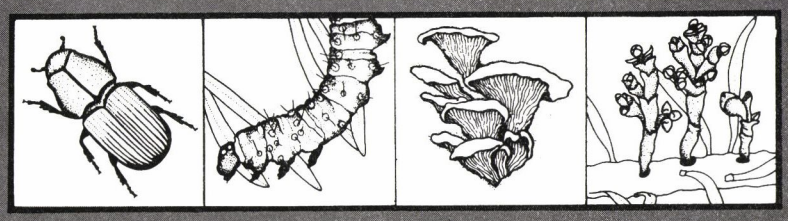
Forest Pest Management



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Report No. 85-16 May 1985

STATUS OF INSECTS AND DISEASES ON EASTSIDE NATIONAL FORESTS AND ADJOINING STATE AND PRIVATE LANDS - 1984[1]

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ABSTRACT

Insects and diseases have the potential of seriously affecting timber associated resources on eastside forests within the foreseeable future. Within the past decade, lodgepole pine mortality attributed to the mountain pine beetle has totaled tens of millions of trees on the Gallatin and Beaverhead National Forests (NF) alone. In that same time, growth loss resulting from western spruce budworm defoliation has been about 90 million cubic feet. Growth loss to dwarf mistletoe for the past decade has been nearly 68 million cubic feet. Root disease-caused losses have likewise been significant.

INTRODUCTION

On portions of the Gallatin and Beaverhead NF's, mountain pine beetle infestations in lodgepole pine are at last beginning to wane in response to host depletion caused by past outbreaks and preventive logging. In some areas on both Forests, new infestations continue to build. Other eastside Forests are experiencing smaller, but in some locations severe, beetle outbreaks which may be expected to spread and intensify.

Spruce budworm infestations are currently found on more than 2 million acres on the six eastside Forests and will likely increase in the next several years. Affecting primarily Douglas-fir on the drier habitat types, budworm outbreaks are currently at the highest levels ever recorded on the Custer, and highest in over 20 years on the Helena and Lewis and Clark NF's. Because infestations historically have been more extensive on the other Forests than at present, we anticipate increasing populations.

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[1]Presentation made at Eastside Chapter of Society of American Foresters April 1985 meeting.

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The synergistic effects of several pests are likely to increase as well. On the Gallatin, Beaverhead, and Custer NF's, increasing Douglas-fir beetle populations are killing trees weakened by budworm defoliation. Similar relationships exist in some Douglas-fir stands between Douglas-fir beetle and root disease. Though not as well documented, we suspect similar complexes of bark beetles (principally western balsam bark beetle) and root pathogens account for most subalpine fir mortality occurring at higher elevations.

STATUS OF MAJOR PESTS BY REPORTING AREA

Beaverhead NF

Mountain pine beetle in lodgepole and whitebark pines, plus western spruce budworm and Douglas-fir beetle in Douglas-fir, are the major insect pests. Dwarf mistletoe in lodgepole pine and root diseases in Douglas-fir and subalpine fir are the primary disease pests. During the past 5 years, mountain pine beetle infestations in lodgepole pine have extended to more than 182,000 acres killing an estimated 200 million board feet (MMBF)[2] of timber. Infestations are currently decreasing in the Centennial Mountains and the Madison Range, but are still at high levels on the east side of the Gravelly Range. Though generally down in the Tobacco Root Mountains, locally heavy infestations remain in the Meadow Creek drainage. At higher elevations where beetle infestations are found, whitebark pines were killed on more than 3,600 acres in 1984. Within the next few years we expect the beetle infestations will generally decrease. Where infestations are still building, however, that will not occur until susceptible hosts--older, larger trees--are killed or removed.

In 1980, lodgepole pine stands were hazard rated for susceptibility to beetle attack. More than 24,000 acres were identified as high hazard; another 235,000 were moderate hazard. Since then, 7,100 acres have been brought under management in an effort to reduce that hazard. Salvage cutting in response to beetle attacks began in 1974. Since that time, salvage and sanitation harvests (to reduce stand hazard) have entailed the removal of 80.5 MMBF of lodgepole pine timber. Those efforts will continue for the next several years. Where beetle populations are still epidemic, as many as 200 trees per acre could be killed over the next 10 years.

Spruce budworm infestations in 1983 occurred on more acres of host type (575,000 acres) than ever recorded previously. In 1984, that figure declined and defoliated trees--principally Douglas-fir--were observed on just over 345,000 acres. The high figure previous to 1983 was recorded in 1957 when 534,000 acres were infested. That was followed by a gradual decline over the next several years as budworm populations were reduced by a combination of natural factors. Based on historical trends, we believe budworm populations may continue to decline over the next several years. Figures for 1984 support

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[2] Bark beetle-caused mortality is expressed in board feet volume/acre. Growth loss resulting from defoliation or mistletoe infection is expressed in cubic feet volume/acre.

that supposition. No great amount of impact data has been collected Region-wide; however, information we do have indicates that budworm defoliation reduces growth of its host an average of 7 cubic feet/acre/year. Based on that information, in excess of 14 million cubic feet of volume has been lost to the effects of defoliation in the past 5 years. Even though the infestation appears to be declining, several million additional cubic feet of volume likely will be lost in the next several years. In addition, actual mortality likely to result from Douglas-fir beetle attacks in weakened trees will increase the loss significantly. Though only 144 MBF (thousand board feet) of Douglas-fir volume has been killed by the Douglas-fir beetle in the past 5 years, we expect that figure to rise markedly in the near future unless preventive measures are taken.

Dwarf mistletoes are the most serious disease agents. Though occurring in both limber and lodgepole pines, dwarf mistletoes are not economically important in the former species. In lodgepole pine, however, 52 percent of the 406,000 acres of commercial lodgepole type is infested with dwarf mistletoe. Resulting growth reduction is estimated at nearly 1.3 million cubic feet per year. As more lodgepole stands are brought under management, that figure should be reduced. Root diseases, particularly those caused by Armillaria mellea and Phaeolus schweinitzii, are important problems in some stands of Douglas-fir and subalpine fir, but impacts have not been determined.

Custer NF

As with all eastside Forests, mountain pine beetle, spruce budworm, dwarf mistletoe, and root disease are the major pests. On the Custer NF, however, mountain pine beetle infestations are more severe in ponderosa pine than lodgepole pine. On the Sioux Ranger District, scattered ponderosa pine mortality occurred on more than 1,400 acres in the Long Pines Unit and in the Chalk Buttes area in 1984. Data from the past 5 years show infestations have extended over as much as 8,300 acres of ponderosa pine type. In that time, more than 460 MBF of timber have been killed. Another 70 MBF of lodgepole pine and 150 MBF of whitebark pine have been killed since 1980 on the Beartooth RD. These infestations are of a chronic nature and will probably continue at about their present rate as long as stand conditions remain the same.

The spruce budworm infestation in the Pryor Mountains has increased greatly in the past 5 years. In 1980, defoliation was observed on only 30,000 acres. Last year, that had increased to more than 95,000 acres--representing more than a half million cubic feet of growth loss in 1984 and 1.7 million cubic feet for the 5-year period. As a direct result, Douglas-fir beetle populations have also increased. More than 118 MBF of Douglas-fir timber have been killed by the beetle on more than 900 acres in that area. We anticipate budworm populations will remain high for several years and beetle-caused mortality will increase accordingly.

An estimated 28 percent of the lodgepole pine type is infested with dwarf mistletoe resulting in 106,000 cubic feet/year growth reduction. Root disease effects are not known, but could be substantial in Douglas-fir and true fir stands.

Deerlodge NF

Mountain pine beetle infestations are just beginning to build to epidemic conditions in some areas. On the Jefferson RD, during the past 5 years, infestations have grown to more than 6,000 acres with a total of more than 1.5 MMBF of lodgepole pine thus far killed. More than 49,000 acres of lodgepole pine have been rated high hazard for beetle attack. Patterns of mountain pine beetle infestations on other eastside Forests suggest the infestations on the Deerlodge NF will continue to increase unless stands are treated to reduce their susceptibility.

The current spruce budworm infestation on National Forest and surrounding lands increased significantly in 1984--up to more than 320,000 acres. Defoliated acres increased only slightly on the Butte and Deerlodge RD's, but marked increases were reported on the remainder of the forest. Populations have fluctuated in the past 5 years, but are generally increasing. Data collected in 1984 indicate defoliation levels likely will increase again in 1985. Over the past 5 years, an estimated 6.5 million cubic feet of growth loss has occurred as a result of budworm defoliation. In some areas, top kill and understory mortality has also been evident. Douglas-fir beetle-caused mortality in the overstory is just beginning to be noticed, but will likely continue as hosts are weakened by repeated defoliation.

Dwarf mistletoe is a significant pest in lodgepole pine. Nearly 47 percent, or 225,000 acres, of host type are infested resulting in an average annual growth reduction of almost 2.5 million cubic feet. Root disease impacts are not known.

Gallatin NF

Mountain pine beetle in both lodgepole and whitebark pines, and spruce budworm in Douglas-fir, subalpine fir, and Engelmann spruce are currently affecting management decisions and timber supplies. Douglas-fir beetle, dwarf mistletoe, and root diseases also impact stands. Mountain pine beetle infestations, in existence on the Hebgen Lake and Bozeman RD's for more than a decade, are declining. On other Districts--Livingston, Gardiner, and Big Timber--infestations are still high or building. Recent beetle infestations have been among the most severe in the Region. In 1981, infested trees were observed on more than 636,000 acres. Mortality figures indicate more than 475 MMBF of lodgepole pine timber have been killed within the past 5 years. Commercial timber stands within the National Forest boundaries were hazard rated for beetle susceptibility in 1980. At that time, only 186,000 acres which had not been infested were identified as being high to moderate hazard. Of those, most have since been infested. Only on the Big Timber RD do fairly extensive, uninfested lodgepole pine stands remain. The forest began sanitation/salvage harvests in 1977. Through 1984, 18,700 acres have been treated, resulting in the harvest of 147.5 MMBF of lodgepole pine timber. Much dead and still susceptible live lodgepole pine remains. These impacted stands and on-going beetle infestations will continue to affect timber supplies for the next several years. Beetle populations in whitebark pine stands at higher elevations are more directly affecting resources other than timber. Management plans for those stands are being developed.

Spruce budworm populations and resulting defoliation remained essentially static from 1983 to 1984. Nearly 575,000 acres of mostly Douglas-fir type exhibited some degree of defoliation last year. During the past 5 years, growth loss is estimated at more than 15 million cubic feet. Our data indicates budworm populations may be reduced slightly in 1985. Still, trees have been so weakened that we anticipate continued population buildups of Douglas-fir beetle. Since 1980, this pest has accounted for 120 MBF of Douglas-fir mortality.

Lodgepole pine dwarf mistletoe causes significant amounts of growth reduction each year. Forty-two percent, nearly 66,000 acres, of susceptible commercial host type is infested. Annual growth loss is about 500,000 cubic feet. The most damaging root pathogen is Phaeolus schweinitzii. Large centers in Douglas-fir stands exhibit mortality due to this disease, principally on the Big Timber RD. These centers are expected to continue to expand, especially on poorer sites.

Helena NF

Western spruce budworm in Douglas-fir stands is the most damaging pest. Locally severe infestations of mountain pine beetle in lodgepole, ponderosa, and whitebark pines; dwarf mistletoe in lodgepole pine; and root disease can also be found. In 1984, we observed budworm-caused defoliation on more than 581,000 acres, with more than two-thirds classed as moderate to heavy. In the past 5 years, more than 8.5 million cubic feet of growth loss has resulted from budworm feeding. Based on historical trends, we believe populations may begin to decline in 1985.

Mountain pine beetle-killed lodgepole pine was observed most frequently on the Townsend RD. That infestation appears to be static at about 1,800 acres. Though more than 7,000 acres are rated high hazard, and another 141,000 acres are moderate, beetle populations have not yet developed to severely damaging proportions on the Forest. Beetle-killed ponderosa and whitebark pines were generally scattered and are not now considered significant.

Dwarf mistletoe and root diseases are important pests. Of 253,000 acres of commercial lodgepole pine, 35.4 percent are infested with dwarf mistletoe. An estimated 814,000 cubic feet/year growth reduction results. Major root disease centers caused by both Armillaria mellea and Phaeolus schweinitzii and other root pathogens occur in Douglas-fir stands. They are particularly common on the Lincoln RD. Root disease impacts will continue until stands are brought under management.

Lewis & Clark NF

Spruce budworm in Douglas-fir and dwarf mistletoe in lodgepole pine are the pests most affecting timber supplies. Budworm infestations were up considerably on the Jefferson Division in the Castle Mountains. Infested acres recorded in 1984 were higher than those observed in 1983. Douglas-fir were defoliated on more than 206,000 acres last year. During the past 5 years, the infestation has fluctuated somewhat with 211,000 acres the highest recorded during the period. During that time, 4.2 million cubic feet growth loss has occurred. The potential for the infestation to continue to expand is great, since in 1959 defoliation was observed on more than 800,000 acres. We expect it will increase again in 1985.

Mountain pine beetle infestations in ponderosa pine around Lewistown have declined in the past few years. Beetle-caused mortality was observed on only 1,300 acres in 1984. Since 1980, however, 9.2 MMBF of ponderosa pine have been killed. Only a small amount of lodgepole pine has been killed, though nearly 200,000 acres of lodgepole pine are considered high hazard for beetle attack. Unless stand hazards are reduced, particularly on the Kings Hill RD, beetle infestations within the near future should be expected.

Nearly 37 percent of the lodgepole pine type is infested with dwarf mistletoe, resulting in 1.5 million cubic feet growth reduction per year. Many large root disease centers are known to be present and are causing mortality on the Rocky Mountain, Kings Hill, and Judith RD's in Douglas-fir stands. Both major pathogens, Armillaria mellea and Phaeolus schweinitzii, have been found. Their spread should be expected unless stands are managed to reduce losses.

CONCLUSION

Management recommendations which can reduce pest-caused mortality, or lessen a stand's susceptibility to pests, are either currently available or are being developed. Risk-rating systems, important "first steps" in any management program, are available--or soon will be--for most major pests. We now know that significant timber losses to insects and diseases are not inevitable. Appropriate and timely integration of stand and pest management can result in vigorous, more efficiently growing stands with significant reductions in pest-related problems.